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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/471,460	12/22/1999	Thomas A Figura	94-0280.03	7429
21186	7590	07/27/2006	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402			LEE, CALVIN	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 07/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/471,460	FIGURA et al.	
	Examiner	Art Unit	
	Lee, Calvin	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 3 July 2006 (Amendment).
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 45-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 45-58 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>10/06/03</u> . | 6) <input type="checkbox"/> Other: |

FINAL ACTION

Response to Amendment

1. The amendment of claims 46, 48 & 52-56 and the addition of claim 58, received on July 3, 2006, are acknowledged.

Claim Rejections - 35 U.S.C. § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:
The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make & use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 48-53, 55 & 58 are rejected under 35 USC 112, 1st paragraph, as failing to comply with the written description requirement. The claims contain subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention

The invention's third embodiment discloses, "an etch resistant layer **80** can be formed within the contact **14** while, simultaneously, the conductive layer **20** is etched ..." Nowhere in the disclosure teaches or suggests etching a conductive material and/or said material (i.e., the etch resistance layer) simultaneously with performing said deposition [of the resistance layer **80**].

Claim Rejections - 35 U.S.C. § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
5. Claims 45-47, 54 and 56-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kurosawa* (US 4,371,407) in view of *Marks et al* (US 5,204,288).

Kurosawa discloses a method of providing a material over a wafer, comprising of:
-performing a deposition of a material 4 in a site over the wafer 1 [Fig. 3B], wherein the step of performing a deposition further comprises depositing a polymer 5 on the wafer [Fig. 3C];
-plasma etching the oxide material 4 in the same general site used to perform the deposition of the oxide material [col. 6, ln.15], wherein the step of etching further comprises etching generally simultaneously with performing the deposition of the polymer [col. 6, ln.19].

a) In re claims 45-46, *Kurosawa* does not explicitly teach or suggest, “deposition occurs at a greater rate within the site than above the features.” *Kurosawa*, however, discloses, “a plasma polymer film is deposited at a rate of about 100Å/min ...”

It would have been obvious to one having ordinary skills in the art to have modified the deposition rate of *Kurosawa* by utilizing the claimed deposition rate because one would adjust either source power or gas flow rate to result in the desired deposition rate of the polymer layer.

Kurosawa teaches providing the material over metal features 3 (reads on claim 47), but not within a site of the metal features. Nevertheless, such material in a site between metal features is known in the semiconductor processing art as evidenced by *Marks* disclosing the same method of providing a material 20b within a site between metal features 14, 15 on a wafer 10 [Fig. 9].

It would have been obvious to one with ordinary skill in the art to modify the process of *Kurosawa* by utilizing a material in a site between metal features for the purpose of providing an etch resistance layer within the site being etched in a subsequent removal of the material, thereby avoiding an over-etch of the semiconductor material surrounding the site.

b) In re claim 54, none of the cited arts suggests the layer’s thickness. The application disclosure suggests “These settings usually cause the etch resistant layer formed on the surface to be thinner than the material formed within the contact. It should be noted that there is an interaction between the listed parameters, and other settings in addition to the ranges listed above may also function adequately. The setting here can be altered by one of ordinary skill in the art from the description herein to customize the etch resistant layer formation for various sizes and shapes of contact, and for various thicknesses within the contact and over the wafer surface. Depending on the application, any thickness of etch-resistant layer may be useful, but an etch-resistant layer 50Å or greater is preferred for most applications.” Again, it’s a matter of choice.

6. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire three months from the mailing date of this action. In the event a first reply is filed within two months of the mailing date of this final action and the advisory action is not mailed until after the end of the three-month shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than six months from the date of this final action.

Response to Arguments

7. Applicants' argument that "*Marks* does not disclose plasma etching of conductive material simultaneously with performing deposition" is persuasive. However the examiner notes in pending claim 48 (as well as claims 45 and 46), that the process step of "etching said material in the same general site used to perform said deposition, wherein said step of etching further comprises etching generally simultaneously with performing said deposition" means the "said material" being etched is the etch resistant layer 80 (the polymer) simultaneously formed within the contact.

Therefore, claims 45-47, 54 & 56-57 are obviated under *Kurosawa* in view of *Marks et al.*

Applicants' argument that "*Kurusawa* does not suggests ... said deposition occurs at a greater rate within said site than above said features" is unpersuasive because the "greater rate" is a matter of choice. Applicant disclosures, "The deposition rate of the polymer ... can be decreased as compared to the polymer formation within the recess by various means, such as by decreasing the source power, by decreasing the flow rate, by increasing the bias power, or by using a combination of these parameters. Other methods of controlling the deposition rate may also be possible and apparent to one of skill in the art ... methods fall within the scope of the invention."

Hence, the applicant's disclosure surely supports making such modification to cure the above defect of *Kurosawa* against claims 45-46.


Applicants also argued that there is no reasonable expectation of success and there is no motivation to combine [*Kurosawa* and *Marks et al*]. The examiner notes in *Marks et al* [Fig. 7] the teaching of material 20a in a space between metal features 14, 15 subjected for “in situ etch of the less dense silicon oxide sidewalls of layer 20a will occur during the deposition” [col. 9, ln.50]. The motivation to do so is to “providing an etch resistance layer within the site being etched in a subsequent removal of the material, thereby avoiding an over-etch of the semiconductor material surrounding the site,” as shown above in the rejections under *Kurosawa* in view of *Marks et al*.

Contact Information

8. Any inquiry concerning this communication from the Examiner should be directed to *Calvin Lee* at (571) 272-1896 on Mondays thru Thursdays 6:30-4:30PM. If attempts to reach the examiner by telephone are unsuccessful, Art Unit 2818's Supervisory Patent Examiner *Matthew Smith* can be reached at (571) 272-1907. The fax number for the organization is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAG or Public PAIR. For more information about the PAIR system, see <http://pair-direct.uspto.gov> Should you have questions on access to the PAG system, contact the Electronic Business Center (EBC) at 1-866-217-9197.

Dated: July 21, 2006



Calvin Lee